CCRCB
Centre for
Cancer Research
& Cell Biology

CANCER
RESEARCH
UK

BELFAST
CENTRE

CRUK Accelerator Award in Molecular Pathology

ECMC

ECMC Annual Network Meeting

Thursday 21 May 2015

The King's Fund, No. 11 Cavendish Square, London, W1G 0AN

DRAFT AGENDA

09:30 - 10:00	Registration and Refreshments	
10:00 - 12:30	Morning Plenary Session - Successful collaborations and patient experience	
10:00 - 10:10	Welcome and introductions	
10:10 - 10:55	ECMC Trial Harmonisation Programme (ETHP) Update: Single Technical Pharmacy Review - by a pharmacist Health Research Authority (HRA) Approval and the Devolved Nations Q&A	Anita Chhabra, Cambridge Janet Messer, HRA
10:55 - 11:25	Collaborating with industry: the Good, the Bad and the Ugly	Andrew Hughes, Manchester
11:25 - 11:45	UK Therapeutic Cancer Prevention Network (UKTCPN) Update	Karen Brown, Leicester
11:45 - 12:05	CRUK Accelerator Award in Molecular Pathology	Manuel Salto-Tellez, Belfast
12:05 - 12:25	ECMC Patient Experience Survey	ECMC Research Nurse Network Group
12:25 - 12:30	Concluding Remarks	
12:30 - 14:00	Networking Lunch	

Queen's University Belfast

THE NORTHERN IRELAND MOLECULAR PATHOLOGY LABORATORY AND THE NORTHERN IRELAND BIOBANK

HSC Belfast Health and Social Care Trust

2015 will be a good year for Molecular Pathology in the UK

2015 – Molecular Pathology
INITIATIVES
ECMC – CMPath Proposal (Elli & Bridget)
MRC Molecular Pathology Document
RCPath - FRCPath for Clinical Scientists
FUNDING OPPORTUNITIES
MRC Molecular Pathology Nodes
Precision Medicine Catapult
CRUK – Accelerator Award

Print this page

NCRI Cancer Conference

NCRI 2015 Conference Programme

Monday 2 November

08:00-08:45	BACR educational workshop
08:00-08:45	De-mystifying today's science: Dr Elaine Vickers talks you through the main scientific themes of today's programme **Elaine Vickers**, Science Communicated
08:50-09:00	Introduction to the programme **Charles Swanton**, Chair of the 2015 Scientific Committee
09:00-09:40	Plenary lecture: Genomics: hype or hope? The future of genomics trials **Fabrice André**, Institut Gustave Roussy, Paris, France
09:40-10:20	Plenary lecture: Big data and patient reported outcome measures (PROMs) **Amy Abernethy**, Duke University School of Medicine, Durham, USA
10:20-10:50	Networking, exhibition viewing, poster viewing and refreshment break
10:50-12:20	Molecular pathology workshop **Manuel Salto-Tellez**, Queen's University Belfast, UK
10:50-12:20	Symposia and workshops Big data **Nicholas Luscombe**, The Francis Crick Institute, London, UK Chromatin, epigenetics and cancer **Tony Kouzarides**, The Gurdon Institute, University of Cambridge, UK Immunotherapy **Adrian Hayday**, King's College London, UK Molecular testing in cancer screening: ready for prime time

Centres Network Accelerator Awards

Our research strategy is built on the understanding that ***effective partnerships are crucial for delivering the greatest impact***. We want to support a united Cancer Research UK community in which our Centres work as a network, not just as individual locations.

To support this aim, we have launched a new funding scheme, ***the Cancer Research UK Centres Network Accelerator Awards***. These awards provide additional infrastructure support that aim to enable Centres to increase collaboration, promote translational research and build capacity in areas of strategic priority for the Centres and Cancer Research UK. The basic remit and eligibility requirements are:

Maximum of £1m per annum for up to five years

Cancer Research UK Centre directors may lead one application

Centres, Major Centres and other non-centre locations may collaborate on any applications

CCRCB Centre for Cancer Research & Cell Biology

CANCER RESEARCH UK

BELFAST CENTRE

Scientific Need – the genotyping of tissue-based cellular compartments in cancer

Technical Need – the development of digital molecular pathology as an available commodity in cancer research

Strategic Need – the training of future molecular pathologists

BELFAST CR-UK ACCELERATOR PROPOSAL

Research Resource – A national digital molecular pathology platform to genotype the epithelial-immune compartments in solid tumours, complemented by a comprehensive Clinical Fellowship programme in Molecular Pathology.

Queen's University Belfast

THE NORTHERN IRELAND MOLECULAR PATHOLOGY LABORATORY AND THE NORTHERN IRELAND BIOBANK

HSC Belfast Health and Social Care Trust

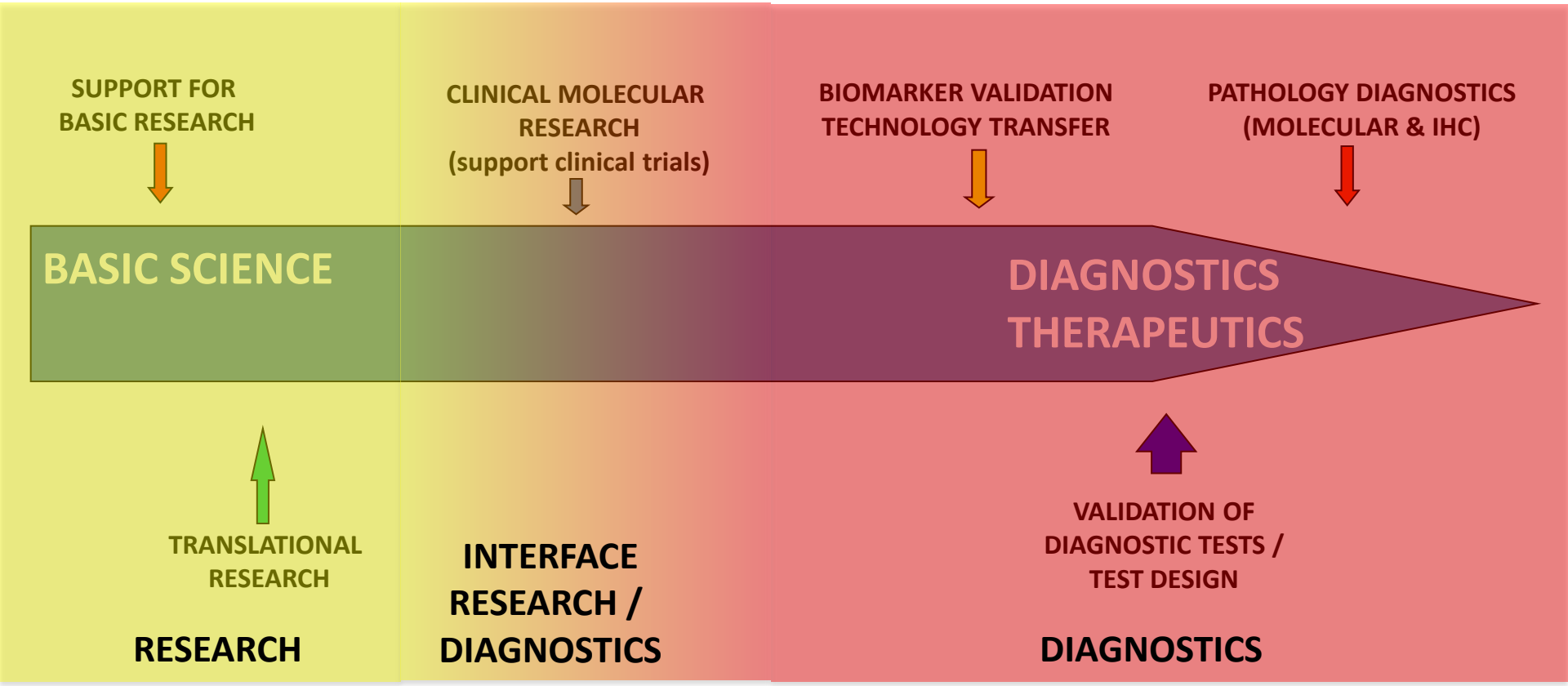
Lead Institution - Belfast
David Waugh (Centre Director)
Manuel Salto-Tellez (Deputy Centre Director and Molecular Pathology Director)
Peter Hamilton (Digital Pathology Lead)
Jackie James (Molecular Pathologist and Training Lead)
Richard Kennedy (Biomarker Discovery Lead)
Mark Lawler (Associate Director of Postgraduate Studies)
Co-leading Institution - Southampton
Peter Johnson (Centre Director)
Gareth Thomas (Lead Molecular Pathology Immune Response)
Christian Ottensmeier (Immunotherapeutics)
Pandurangam Vijayanand (Micro-transcriptomic & epi immune cell analysis)
Network Members
Sebastian Brandner (UCL Neuropathology)
Andy Hall (Newcastle)
David Gonzalez de Castro (London)
John Le Quesne (Leicester)
Caroline Dive (Manchester)

BACKGROUND 1
AN INTEGRATED MOL PATH MODEL

CCRCB Centre for Cancer Research & Cell Biology

Our mission is to improve patient care through the development of:

1. Biomarkers for prognosis, prediction and markers of response
2. Biologically determined targeted therapies.



BACKGROUND 1
AN INTEGRATED MOL PATH MODEL

Test with a Predominant Diagnostic Value
Sarcoma Translocation Detection
Lymphoma Translocation Detection
Clonality Testing
Test with a Predominant Genetic Value
Microsatellite Instability Testing
Mismatch Repair Protein Expression
Tests with a Predominant Therapeutic Value
KRAS/NRAS Mutation Testing
BRAF Mutation Testing
EGFR Mutation Testing
ALK Protein Expression
EML4-ALK Translocation Detection
Multiple Central Nervous System Molecular Testing
ER, PR and Her2 Protein Expression
Her2 Amplification
c-KIT Mutation Analysis
PDGFRA Mutation Analysis

Integrating molecular diagnostics into histopathology training: the Belfast model

C Flynn,[1] J James,[1,2] P Maxwell,[1,2] S McQuaid,[1,2] A Ervine,[1] M Catherwood,[3] M B Loughrey,[1] D McGibben,[1] J Somerville,[1] D T McManus,[1] M Gray,[1] B Herron,[1] M Salto-Tellez[1,2]

BACKGROUND 1
AN INTEGRATED MOL PATH MODEL

Table 1 – Pathology-centred activities in the research endeavour.

Molecular diagnostics in the context of clinical trials
Analysis of tissues ahead of molecular analyses
Tissue biobanking
Digital pathology
Pathology informatics
Data manager
Biomarker validation
Integration of validated biomarkers into routine diagnostics

Table 2 – Digital pathology.

Automated digitalization of images for storage and multi-site discussion
Automated scoring of IHC
Automated counting of hybridization signals
Automated identification of tumour in sections for subsequent microdissection

Table 3 – Pathology bioinformatics.

Digital imaging
Pathology integration of pathological data, clinical data and biomarker analytical results
Translation of high-throughput analysis to biomarkers with meaningful diagnostic/clinical relevance
Translation of high-throughput analysis to pathology reports

Review

Molecular pathology – The value of an integrative approach

Manuel Salto-Tellez[a,b,*], *Jacqueline A. James*[a,b], *Peter W. Hamilton*[a]

[a]Northern Ireland Molecular Pathology Laboratory, Centre for Cancer Research and Cell Biology, Queen's University, Belfast, Northern Ireland, UK
[b]Tissue Pathology, Belfast Health and Social Care Trust, Belfast, Northern Ireland, UK

Molecular Oncology

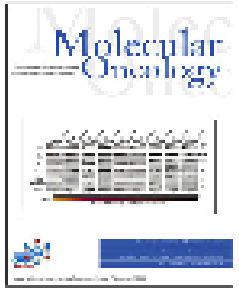
BACKGROUND 1
AN INTEGRATED MOL PATH MODEL

MOLECULAR ONCOLOGY 8 (2014) 1163–1168

available at www.sciencedirect.com

ScienceDirect

www.elsevier.com/locate/molonc



Review

Molecular pathology – The value of an integrative approach

Manuel Salto-Tellez[a,b,*], Jacqueline A. James[a,b], Peter W. Hamilton[a]

[a]Northern Ireland Molecular Pathology Laboratory, Centre for Cancer Research and Cell Biology, Queen's University, Belfast, Northern Ireland, UK
[b]Tissue Pathology, Belfast Health and Social Care Trust, Belfast, Northern Ireland, UK

CCRCB Centre for Cancer Research & Cell Biology

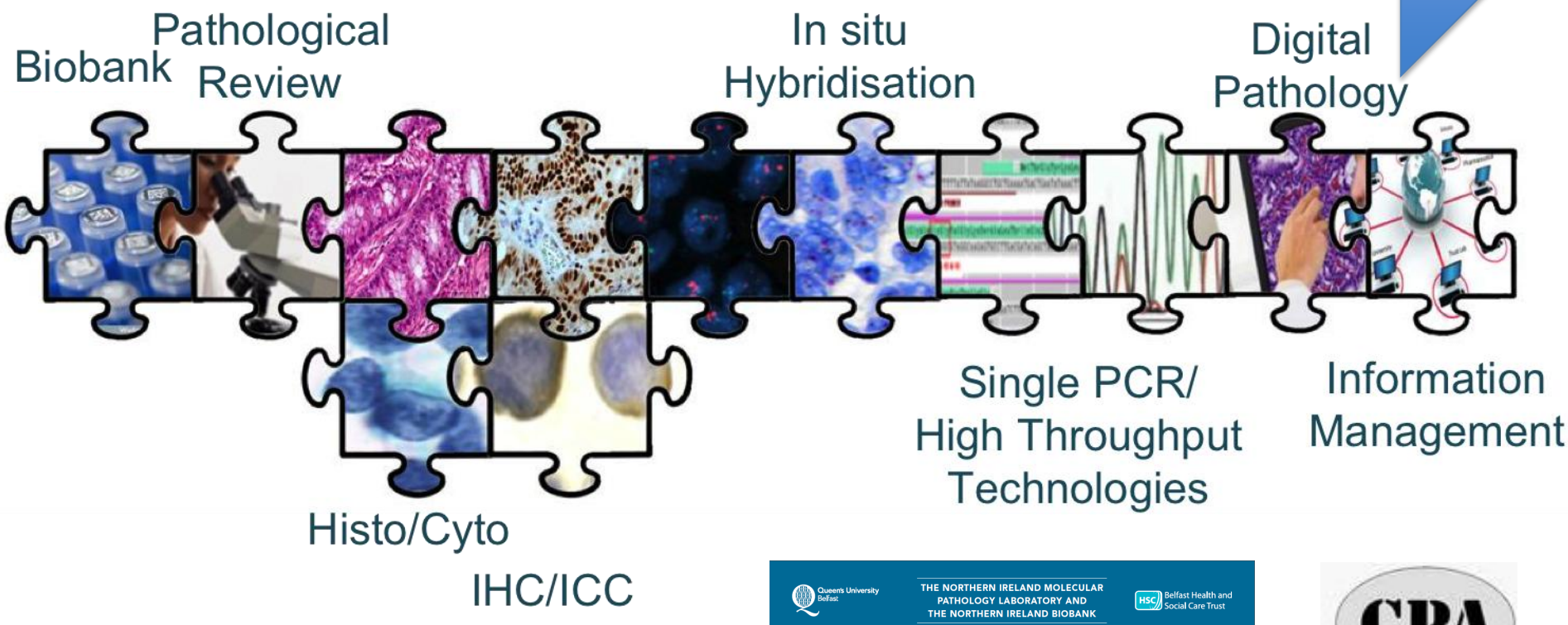
CANCER RESEARCH UK | BELFAST CENTRE

BACKGROUND 1
AN INTEGRATED MOL PATH MODEL

Northern Ireland Molecular Pathology Laboratory (NI-MPL)

End to End Diagnostic and Research Service

Cutting Across Technologies and Infrastructures



Queen's University Belfast | THE NORTHERN IRELAND MOLECULAR PATHOLOGY LABORATORY AND THE NORTHERN IRELAND BIOBANK | HSC Belfast Health and Social Care Trust

CPA

UKNEQAS

Salto-Tellez et al. Molecular Oncology, 2014

a

NIBiobank
Northern Ireland Biobank

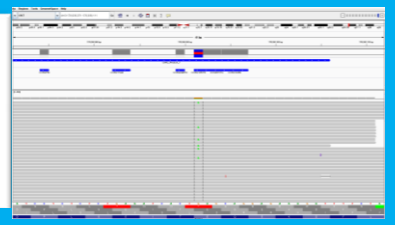
FFPE Material

b

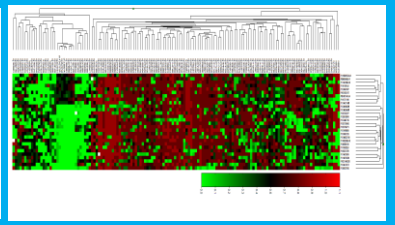
PICan
Pathology Integromics in Cancer

Clinical Information

c



Discovery HT Technologies



Fresh sample collection

h

PICan
Pathology Integromics in Cancer

Bioinformatics Analysis

e

New Biology

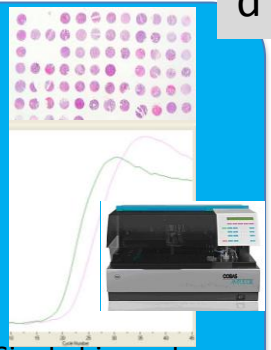
New Taxonomy

New Treatments

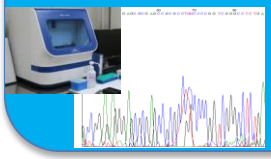
f

In-vitro confirmation of the relevance of the discoveries

d



Single biomarker validations



New Clinical Trial

g

PDX

j

BACKGROUND 2
DIGITAL MOLECULAR PATHOLOGY

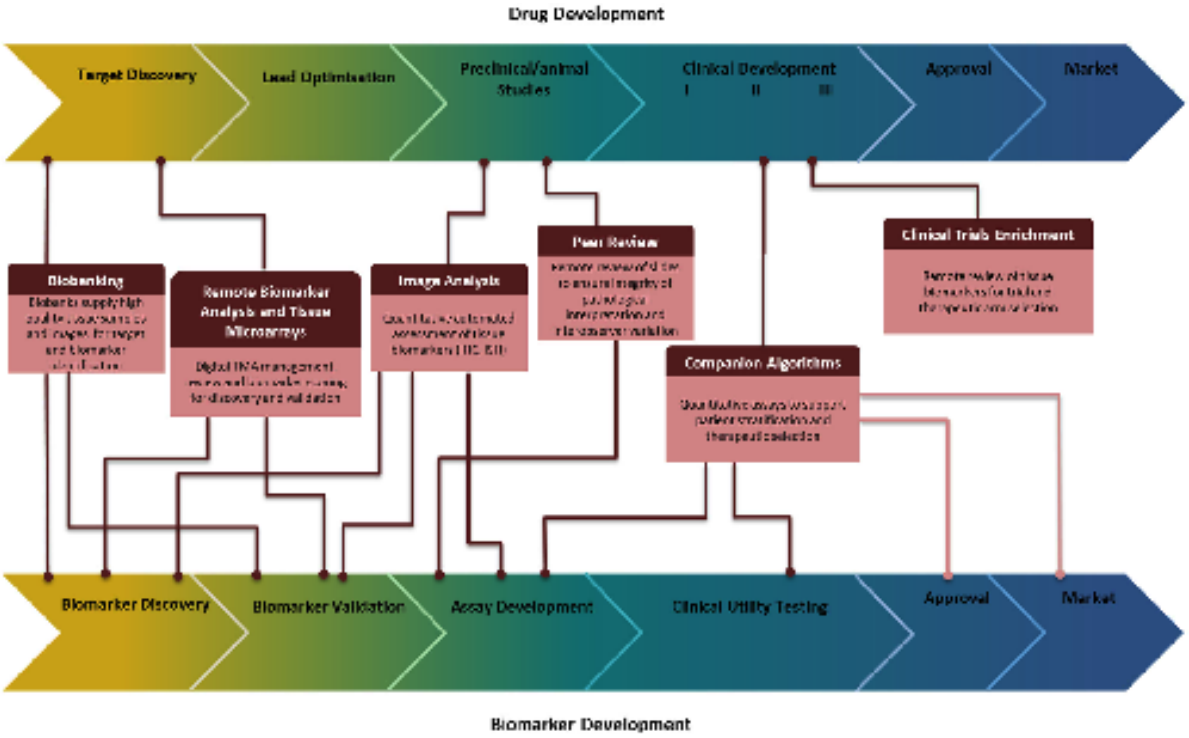


Fig. 9. The role of digital pathology in drug development and companion biomarker discovery and validation.

YMETH 3459
16 July 2014
ARTICLE IN PRESS
No. of Pages 15, Model 5G

Methods xxx (2014) xxx–xxx

Contents lists available at ScienceDirect

Methods

journal homepage: www.elsevier.com/locate/ymeth

Digital pathology and image analysis in tissue biomarker research

Peter W. Hamilton *, Peter Bankhead, Yinhai Wang, Ryan Hutchinson, Declan Kieran, Darragh McArt, Jacqueline James, Manuel Salto-Tellez

Bioimaging and Informatics, Centre for Cancer Research & Cell Biology, Queen's University Belfast, 97 Lisburn Road, Belfast BT9 7BL, Northern Ireland, United Kingdom

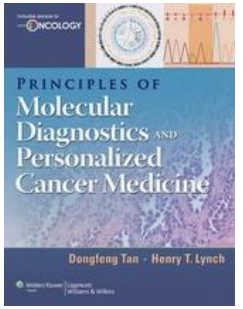
HOW TO ADDRESS HETEROGENEITY:

TOPOGRAPHIC HETEROGENEITY: Analyzing as many different parts of the tumor as possible

HISTOGENETIC HETEROGENEITY: Analyzing many cell types as available

TEMPORAL HETEROGENEITY: Analyzing as many samples from the same tumor in the course of time

COMPARTMENTAL HETEROGENEITY: Analyzing as many body compartments as possible, such as primary tumor, circulating tumor cells, and exosomes or plasma.



Salto-Tellez M. In: *Tan & Lynch's Principles of Molecular Diagnostics and Personalized Cancer Therapy,* Lippincott Williams & Wilkins, 2012

CCRCB Centre for Cancer Research & Cell Biology

CANCER RESEARCH UK BELFAST CENTRE

UNIVERSITY OF Southampton

Target 1
HETEROGENEITY AND CANCER IMMUNOLOGY

Therapeutic Targeting of Integrin αvβ6 in Breast Cancer

Kate M. Moore, Gareth J. Thomas, Stephen W. Duffy, Jane Warwick, Rhian Gabe, Patrick Chou, Ian O. Ellis, Andrew R. Green, Syed Haider, Kellie Brouilette, Antonio Saha, Sabari Vallath, Rebecca Bowen, Claude Chelala, Diana Eccles, William J. Tapper, Alastair M. Thompson, Phillip Quinlan, Lee Jordan, Cheryl Gillett, Adam Brentnall, Shelia Violette, Paul H. Weinreb, Jane Kendrew, Simon T. Barry, Ian R. Hart, J. Louise Jones*, John F. Marshall*

BJC

British Journal of Cancer (2014) 110, 489–500 | doi: 10.1038/bjc.2013.639

Keywords: human papillomavirus; tumour-infiltrating lymphocytes; oropharyngeal cancer; survival; prognosis

Tumour-infiltrating lymphocytes predict for outcome in HPV-positive oropharyngeal cancer

M J Ward[1,2], S M Thirdborough[1], T Mellows[1], C Riley[1], S Harris[3], K Suchak[4], A Webb[5], C Hampton[6], N N Patel[2], C J Randall[2], H J Cox[7], S Jogai[8], J Primrose[9], K Piper[4], C H Ottensmeier[1,10], E V King[1,7,10,11] and G J Thomas*[,1,8,10,11]

Co-leading Institution - Southampton

Peter Johnson (Centre Director)

Gareth Thomas (Lead Molecular Pathology Immune Response)

Christian Ottensmeier (Immunotherapeutics)

Pandurangam Vijayanand (Micro-transcriptomic & epi immune cell analysis)

Identification and Validation of an Anthracycline/ Cyclophosphamide–Based Chemotherapy Response Assay in Breast Cancer

Jude M. Mulligan, Laura A. Hill, Steve Deharo, Gareth Irwin, David Boyle, Katherine E. Keating, Olaide Y. Raji, Fionnuala A. McDyer, Eamonn O'Brien, Max Bylesjo, Jennifer E. Quinn, Noralane M. Lindor, Paul B. Mullan, Colin R. James, Steven M. Walker, Peter Kerr, Jacqueline James, Timothy S. Davison, Vitali Proutski, Manuel Salto-Tellez, Patrick G. Johnston, Fergus J. Couch, D. Paul Harkin, Richard D. Kennedy

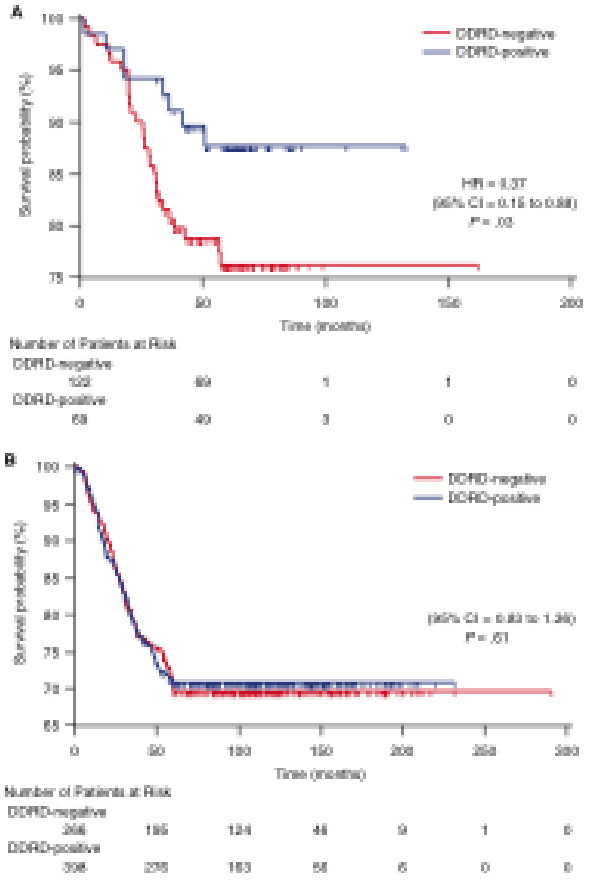


Table 4. Association of the DNA damage response deficiency (DDRD) assay with estrogen receptor (ER) status, HER2 status, and lymphocytic infiltration within validation datasets

Adjuvant dataset	Total No.	DDRD-positive, %	*P**
Adjuvant			
ER-positive	112	25.0	<.001
ER-negative	77	52.0	
HER2-positive	46	41.3	.26
HER2-negative	128	32.0	
Triple negative	44	54.6	.001
Non–triple negative	135	28.2	
Lymphocytic infiltrate positive	35	74.3	<.001
Lymphocytic infiltrate negative	155	27.7	
Neoadjuvant			
ER-positive	70	24.3	<.001
ER-negative	134	67.9	

J Natl Cancer Inst. 2014 Jan;106(1):djt335. doi: 10.1093/jnci/djt335.

Target 1
HETEROGENEITY AND CANCER IMMUNOLOGY

EUROPEAN UROLOGY 64 (2013) 177–188

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

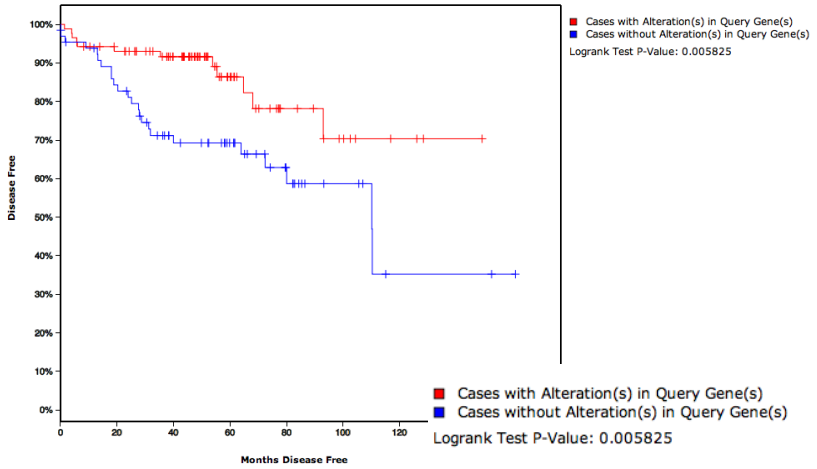
European Association of Urology

Platinum Priority – Prostate Cancer

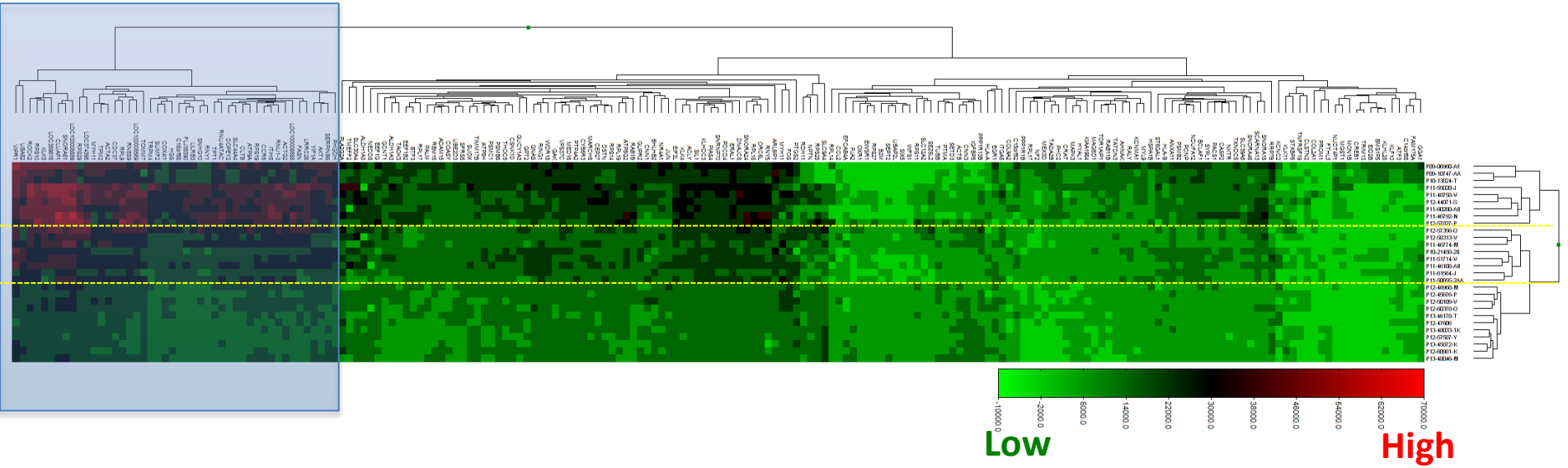
Editorial by Zoran Culig on pp. 189–190 of this issue

Potentiation of Inflammatory CXCL8 Signalling Sustains Cell Survival in PTEN-deficient Prostate Carcinoma

Pamela J. Maxwell [a], Jonathan Coulter [a], Steven M. Walker [a,b], Melanie McKechnie [a], Jessica Neisen [a], Nuala McCabe [b], Richard D. Kennedy [a,b], Manuel Salto-Tellez [a], Chris Albanese [c], David J.J. Waugh [a,]*



	#total cases	#cases relapsed	median months disease free
Cases with Alteration(s) in Query Gene(s)	87	12	1.41
Cases without Alteration(s) in Query Gene(s)	66	24	110.16



Immune Modulation in Cancer with Antibodies

David B. Page,[1] Michael A. Postow,[1] Margaret K. Callahan,[1] James P. Allison,[2] and Jedd D. Wolchok[1]

[1]Ludwig Center for Cancer Immunotherapy, Memorial Sloan-Kettering Cancer Center, New York, New York 10065; email: pageb@mskcc.org, postowm@mskcc.org, callahan@mskcc.org, wolchokj@mskcc.org
[2]Department of Immunology, M.D. Anderson Cancer Center, Houston, Texas 77030; email: jallison@mdanderson.org

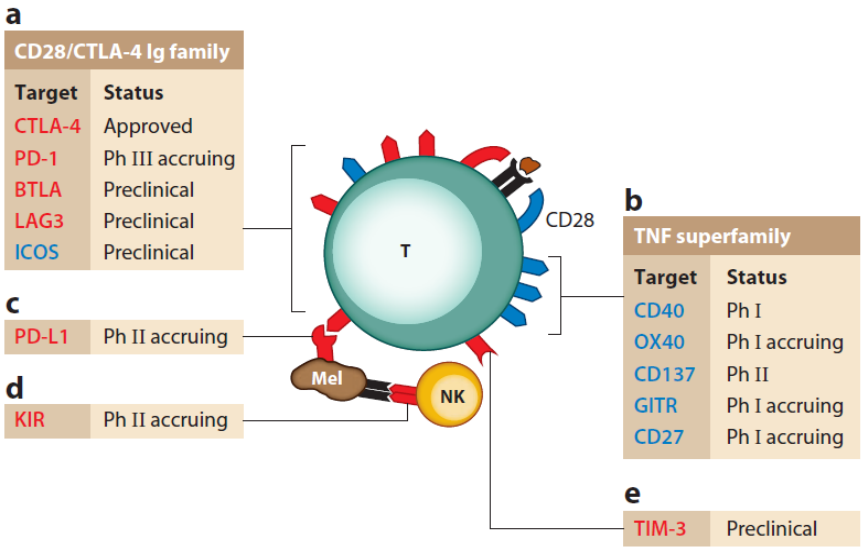


Figure 1

Targets of antibody immune modulators. (*a*) Targetable members of the CD28/CTLA-4 immunoglobulin superfamily include cytotoxic T lymphocyte antigen 4 (CTLA-4) (1), programmed cell death protein 1 (PD-1) (5, 7), B and T cell attenuator (BTLA) (84), lymphocyte activation gene 3 (LAG3) (85), and inducible T cell costimulator (ICOS) (86). (*b*) Targetable members of the tumor necrosis factor (TNF) superfamily include CD40 (87, 88), OX40 (89), CD137/4-1BB (90), glucocorticoid-induced TNFR-related protein (GITR) (91), and CD27. (*c*) Programmed cell death 1 ligand 1 (PD-L1). Mel: melanoma. (*d*) Killer inhibitory receptor (KIR). (*e*) T cell Ig and mucin-containing domain 3 (TIM3).

CCRCB Centre for Cancer Research & Cell Biology

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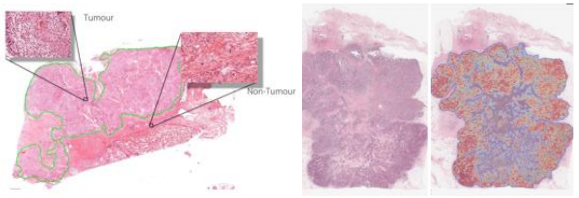
Target 2
DIGITAL PATHOLOGY & GENOMICS



Hamilton P (Salto-Tellez M). Oncotarget 2015 (accepted)

THE ROYAL MARSDEN

MOLECULAR PATHOLOGY PROGRAMME – GENOMICS

Ion Torrent | Illumina iScan | Affymetrix | Illumina MiSeq | Illumina NextSeq


Validation of Next Generation Sequencing Technologies in Comparison to Current Diagnostic Gold Standards for *BRAF*, *EGFR* and *KRAS* Mutational Analysis


INVITED COMMENTARY
Next-generation sequencing: a change of paradigm in molecular diagnostic validation?


Identification of Clinically Relevant Genomic Alterations in Prostate Cancer


Diagnostic value of increased sensitivity by massively parallel sequencing

2,000 CRC transcriptomics

MRC Medical Research Council

Validation of WES & RNA-Seq

MRC Medical Research Council

CANCER RESEARCH UK

Validation of WGS

Genomics england

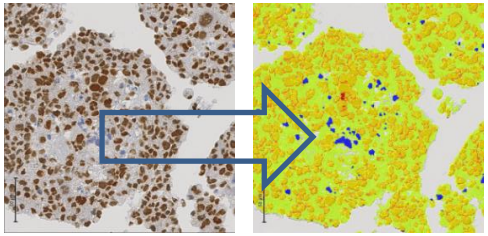
The 100,000 Genomes Project

UCL INSTITUTE OF NEUROLOGY
UCL

Tumor and Stem Cell Biology

Cancer Research

Comparative Expression Analysis Reveals Lineage Relationships between Human and Murine Gliomas and a Dominance of Glial Signatures during Tumor Propagation *In Vitro*



Nico V. Henriquez[1], Tim Forshew[2], Ruth Tatevossian[2], Matthew Ellis[1], Angela Richard-Loendt[1], Hazel Rogers[5], Thomas S. Jacques[3], Pablo Garcia Reitboeck[1], Kerra Pearce[4], Denise Sheer[2], Richard G. Grundy[5], and Sebastian Brandner[1]

CCRCB Centre for Cancer Research & Cell Biology

CANCER RESEARCH UK | BELFAST CENTRE

THE CLINICAL FELLOWSHIP PROGRAMME
MSc in Molecular Pathology

MRC Molecular Pathology Review

MSC HSC Molecular Pathology Curriculum Development
Academic Modules

FRCPath Curriculum for Clinical Scientists
(in part fulfilment for Modernising Scientific Careers Programme Higher Specialist Scientific Training)

Specialty: MOLECULAR PATHOLOGY

Chair: Dr George Vassiliou
Contributors: Professor Manuel Salto-Tellez
Professor Ian Cree
Dr John Paul
Dr Tim Wreghitt
Dr Martin Barnardo
Dr Elizabeth Hodges
Professor Finbarr Cotter
Dr Mike Scott
Dr Carolyn Grove
Dr Rachel Butler
Dr Fiona MacDonald

Integrating molecular diagnostics into histopathology training: the Belfast model

C Flynn,[1] J James,[1,2] P Maxwell,[1,2] S McQuaid,[1,2] A Ervine,[1] M Catherwood,[3] M B Loughrey,[1] D McGibben,[1] J Somerville,[1] D T McManus,[1] M Gray,[1] B Herron,[1] M Salto-Tellez[1,2]

Outline of topic	Description
DNA	Overview, structure, replication
RNA	Transcription, types/structures, RNA polymerases, regulation of transcription, microRNAases
Proteins	Amino acids, genes and genetic code, translation
NA extraction methods	Isolation of DNA and RNA, assessment of quality and quantity of nucleic acids
PCR	History of PCR, advanced PCR and PCR optimisation, PCR detection and evaluation techniques, limitations of PCR and troubleshooting
Analysis and characterisation of NA	Hybridisation technologies, detection systems, results interpretation
Nucleic acid amplification	Target, probe and signal amplification
Gene mutations	Types, detection and nomenclature of gene mutations
DNA sequencing	Direct sequencing, bioinformatics
Molecular oncology	Analytic targets of molecular testing, gene rearrangements
High-throughput technologies	DNA/RNA microarrays, NGS and TGS, whole genome sequencing
Validation and optimisation procedures	R&D within molecular diagnostics present and future
Quality control and quality assurance	Discussion of QA and QC in molecular diagnostics
Regulation in the use of human tissues for research	Introduction to biobanking, research ethics and research governance within academia and the healthcare setting
Core skills in slide annotation	Be able to identify and annotate areas for macrodissection relevant to downstream testing. Be able to assign percentage tumour content
Core skills in macrodissection	Taught how to perform tissue macrodissection procedures
Core skills in DNA extraction	Taught how to perform DNA extraction procedures

QA, quality assurance; QC, quality control; NA, nucleic acid; NGS, Next Generation Sequencing; TGS, Third Generation Sequencing.

Principles

Knowledge and skills in core molecular technologies and techniques
Expertise in the molecular pathology of breast cancer
Expertise in the molecular pathology of colorectal cancer
Expertise in the molecular pathology of lung cancer
Expertise in the molecular pathology of malignant melanoma
Expertise in the molecular pathology of gastrointestinal stromal tumours (GISTs)
Expertise in the molecular pathology of sarcomas
Expertise in the molecular pathology of paediatric cancers, thyroid cancer, central nervous system neoplasias and others
Research, development and innovation in molecular pathology
Leadership and management of a molecular diagnostic laboratory
Training and education

JCP Online First, published on February 3, 2014 as 10.1136/jclinpath-2014-202176

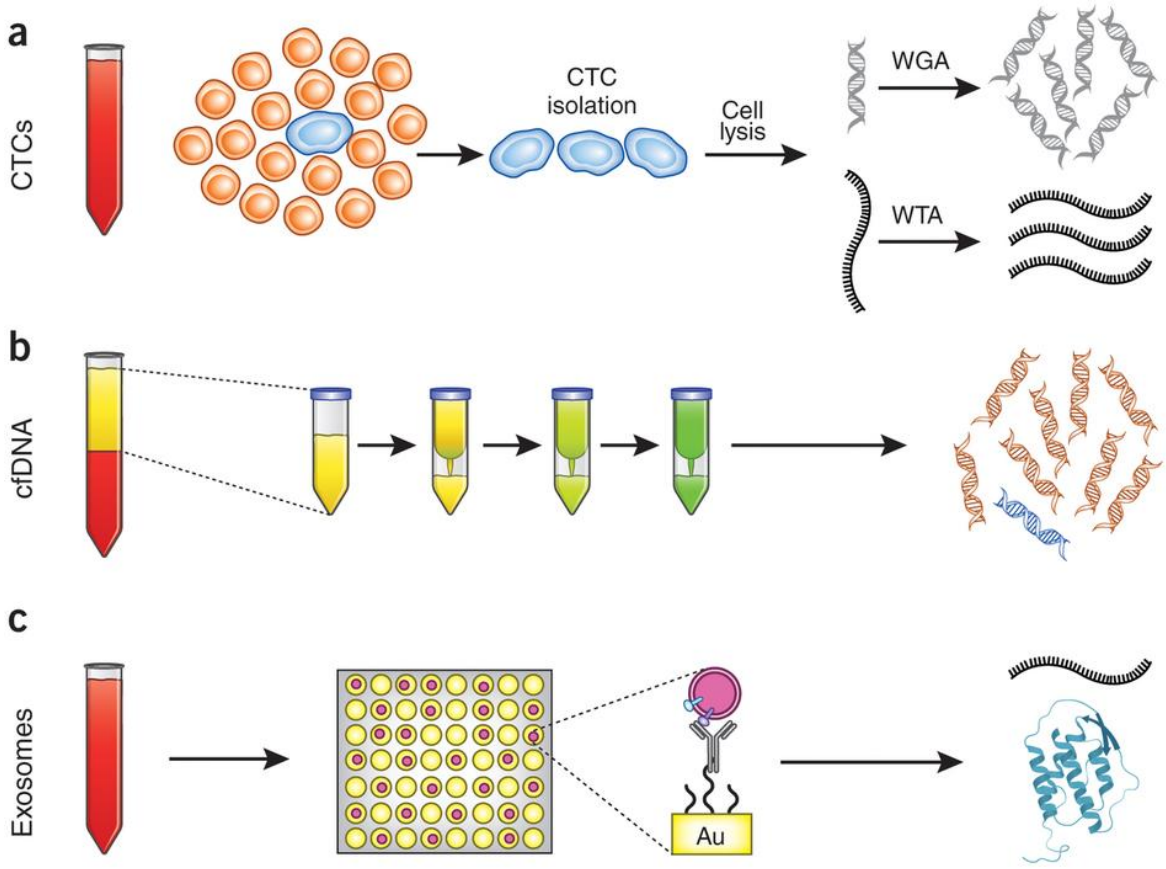
Viewpoint

Integrating molecular diagnostics into histopathology training: the Belfast model

C Flynn,[1] J James,[1,2] P Maxwell,[1,2] S McQuaid,[1,2] A Ervine,[1] M Catherwood,[3] M B Loughrey,[1] D McGibben,[1] J Somerville,[1] D T McManus,[1] M Gray,[1] B Herron,[1] M Salto-Tellez[1,2]

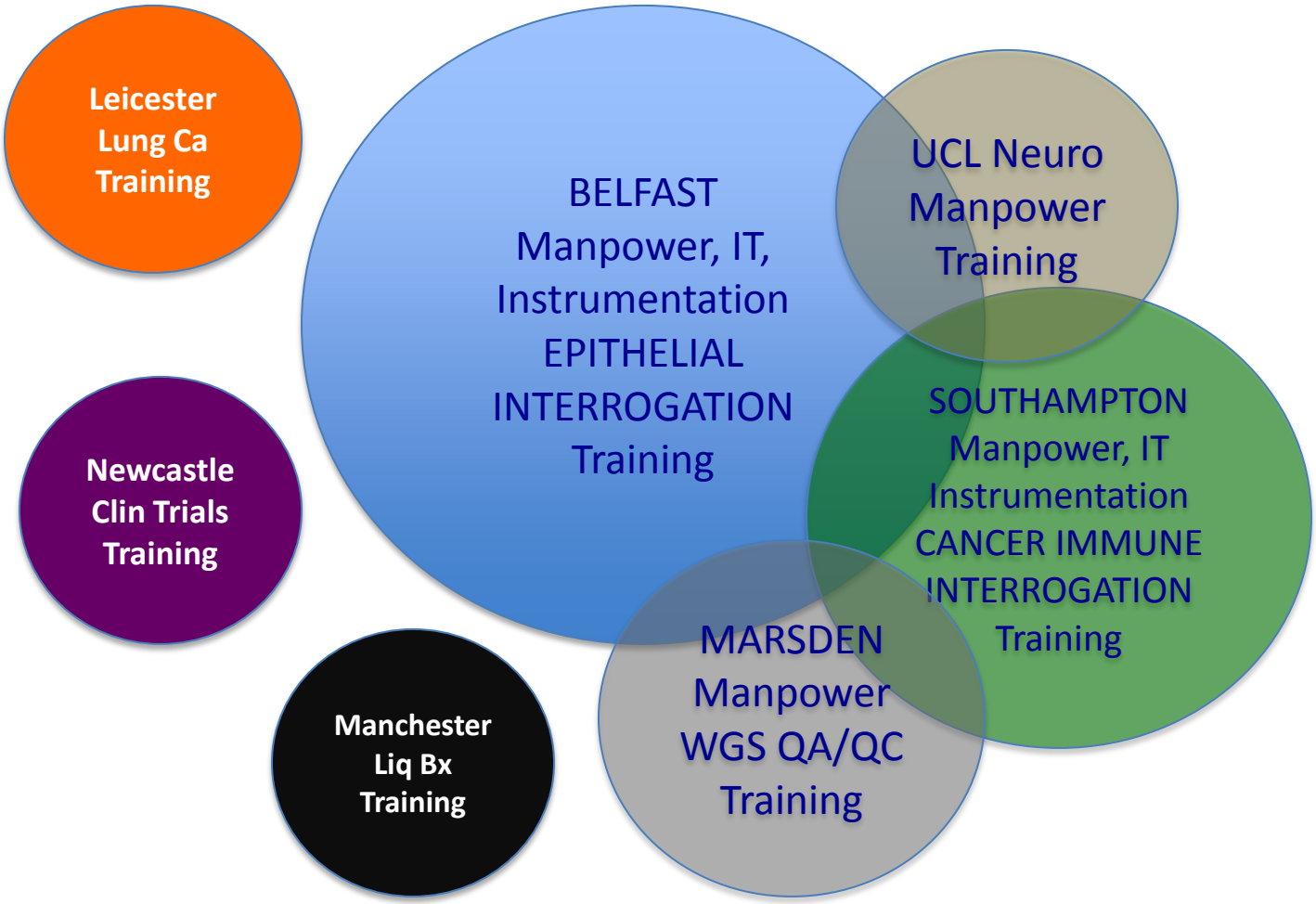
Molecular Pathology			
Introductory lectures on molecular diagnostics	Compulsory 2-3 month attachment in molecular diagnostics (See Table 1)		OPTION 1: 1 year full-time tissue molecular diagnostics (see Table 2) OPTION 2: 1 year "supersocialty" attachment with part time practice in a subspecialty and part time reporting the related molecular tests OPTION 3: Mixture of diagnostics and research
General Training Framework			
Year 1 assessment at end of year to exit stage	Exit stage with FRCPath part 1 examination	Exit Stage with FRCPath part 2 examination with/without extra modules in Autopsy and Gynaecological cytology (additional 3 months each)	End of Training

MANCHESTER 1824



Speicher MR, Pantel K.Nat Biotechnol. 2014 May;32(5):441-3.

CRUK DIGITAL MOLECULAR PATHOLOGY & TRAINING NETWORK



THE PROPOSAL

1.
To create a “common digital pathology language” across the members of the proposal

2.
To use digital pathology to describe tumour heterogeneity and cancer immunology

3.
To improve the efficiency of NGS through digital pathology pre-analytical interventions

4.
To develop “digital neuropathology” in CNS oncology

5.
To create a structure of Clinical Fellowships /MSc in different aspects of Molecular Pathology (Including liquid biopsy pathology, lung digital pathology and the pathology of early-phase clinical trials)

CCRCB Centre for Cancer Research & Cell Biology

CANCER RESEARCH UK | BELFAST CENTRE

BELFAST CR-UK ACCELERATOR PROPOSAL

True partnership to develop and consolidate molecular pathology in the UK

Focusing on an area of significant need (digital molecular pathology) and with a strong training programme

Attending to a very specific scientific purpose (tissue genotyping of specific cellular compartments)

Partnership (Belfast-Southampton) and a true network

Proposal that has the potential of transforming the molecular pathology scene in the UK

Queen's University Belfast

THE NORTHERN IRELAND MOLECULAR PATHOLOGY LABORATORY AND THE NORTHERN IRELAND BIOBANK

HSC Belfast Health and Social Care Trust

CANCER RESEARCH UK | BELFAST CENTRE

MRC Medical Research Council

HSC Belfast Health and Social Care Trust

HSC Public Health Agency

Queen's University Belfast

Friends of the cancer centre

NIBiobank

Laughing Matters

ECMC

Tom Simms Memorial Fund